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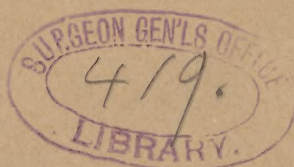
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WITH THE COMPLIMENTS
OF THE AUTHOR.

A CASE OF
INTRACRANIAL MYXO-SARCOMA,

DESTROYING THE WHOLE OF THE ORGAN OF HEARING,
BURSTING THROUGH THE EXTERNAL PARTS, AND
FORMING A LARGE TUMOR WHICH DEPENDED
FROM THE EAR.

By OREN D. POMEROY, M.D.,
NEW YORK.

(Reprinted from the AMERICAN JOURNAL OF OTOLGY, April, 1881.)



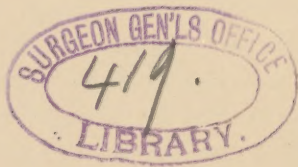
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A CASE OF INTRACRANIAL MYXO-SARCOMA, DESTROYING THE WHOLE OF THE ORGAN OF HEARING, BURSTING THROUGH THE EXTERNAL PARTS, AND FORMING A LARGE TUMOR WHICH DEPENDED FROM THE EAR.

EFFIE B. R., aged six years, came to the Manhattan Eye and Ear Hospital on April 17, 1880, complaining of a convergent squint in the left eye, which had existed ten weeks. A few days previous to the suddenly developing squint the patient complained of seeing double.

The eye is turned very far toward the nose, and hardly moves at all, as though the internus was in a state of spasm.

The hearing of the right ear was W. $\frac{24}{6}$; of the left, W. contact. In the right were symptoms of chronic catarrhal otitis media, the membrana being somewhat sunken. The left has a minute polypus in the tympanum protruding through a small perforation of the membrana. The tuning-fork is heard best in the left ear. There was no history of a suppurative process in either ear.

A consultation was called, and a diagnosis of malaria or basilar meningitis was made. Pulse and temperature normal.

Quinine was first administered in large doses; afterward iodide of potass. was given—ten drops of the saturated solution three times a day, increased after a few days to thirty drops.

Faradism was also used to the affected muscle. The granulation was removed from the ear by forceps. After the first week the patient complained of pain in the left eye and ear, glancing downward to the throat. Iodine on the temple, a blister to the mastoid, and atropine in the eye, relieved this pain for a time. Patient behaves somewhat too quiet; bowels constipated; sleeps

too much, and is only awakened when a paroxysm of pain in the eye occurs. In from eight to nine days the squint disappeared, but the third nerve was found to be completely paralyzed, the eye standing nearly still in the centre of the palpebral fissure, and the lid drooping so as nearly to close the eye. The inferior oblique acted. Pulse occasionally runs up to 130, but evidently under the influence of excitement, for the temperature was never above the normal. The pain in the eye again returning despite previous treatment, McMunn's elixir of opium was administered. If the patient is spoken to or in any way disturbed, she will cry out and show signs of great irritability. Ophthalmoscope reveals signs of hyperæmic nerve.

Iodide of potass. seems to render the mouth sore, so it is discontinued for a few days.

On May 26th noticed a little twitching of the hands and feet, more of the left than the right.

On the 27th the pulse, during a paroxysm of pain, was 130; twenty minutes afterward, when the pain subsided, it was only 84. The eye seems tender, although not congested at all, and she will scream out if it is touched. There was a little shaking of the left foot only. The mouth is for the first time drawn to the right side, and she talks a little "thick." The tongue is protruded toward the right. Respiration has all along been tested, and varies with the pulse, and probably for the same reason. The mind is, and always has been clear, and has continued so during the whole of the illness; will occasionally have periods of brightening up and appearing natural. Nourishment is carefully attended to, though she is disinclined to take much unless urged. On the 31st of May had no unpleasant symptoms except a darkish coating of lips and gums—probably the effects of the iodide of potass. Is inclined to pick at her mouth and nose.

June 1st.—Has return of pain in the eye, and the ear is noticed to have an offensive discharge. On examination, a soft gelatinous tumor was seen nearly filling the meatus. This was removed by forceps, but, the material being soft and friable, a specimen could not be obtained for examination. Some hemorrhage followed its removal.

June 2d.—Some nausea; lid does not droop so much as at first, on account of a more complete paralysis of the orbicularis.

Symptoms for the next few days were somewhat ameliorated, and on June 5th she was sent home to the country, a distance of seventy miles. Dr. Ruff, of New York, saw the patient several times with me. Carbolic acid was used for the offensive discharge from the ear, and iodide of potass. was ordered to be continued. Attention to the bowels, and to supporting by appropriate nourishment, was directed.

By this time there seemed little doubt but that the ear was the source of all the symptoms, and from the rapid reappearance of the aural tumor, malignant disease was strongly suspected. In the country the patient was under the care of the family physician, who attended to the symptoms as they arose. After a few weeks the ear again filled with a softish tumor similar to the one removed. This was followed soon after by a tumor just behind the lobulus, and another in front, just beneath the tragus. These tumors grew with most alarming rapidity, so that on August 15th, when she had returned to town, they were of the size depicted in the illustration (Plate I., Fig. 1), but considerably smaller than when the autopsy was made.

A photograph was attempted, but the patient could not be kept sufficiently still. The tumor now was here and there bloody, with spots which had undergone decomposition, and, it being warm weather, flies were constantly alighting on it and rendering the patient very restive; the tumor was extremely offensive. Dr. J. A. Andrews, Assistant Surgeon to the Manhattan Eye and Ear Hospital, made the drawing which appears in the illustration. Effort was made to hold the child's head still, in order to be photographed, but the patient would resist so that the strongest man could not restrain her movements, these being accompanied by loud and piercing cries distressing to listen to. The child was then taken home, with proper directions given for the symptoms which might arise.

I heard from the patient from time to time. The mind was always clear; evidently there was no brain trouble, unless the twitching of the hands and feet indicated it. Deglutition became more

and more difficult as the paralysis became more complete. There has been some pain about the back of the neck, in the region of the tumor. She usually has slept moderately well. The tumor was horribly offensive until toward the last, when the disinfectants (carbolic acid and liq. sod. chlo.) seemed to have overcome the stench (or perhaps there was less decomposed tissue). The tumor seemed to occasionally slough in places, when the size would be considerably diminished, to again be increased by subsequent growth. After death the mother states that the tumor was at least one-third smaller than just previously. Ten days before death the patient felt hungry, but found so much difficulty in swallowing that very little food was taken, and that would be placed on the right side of the mouth, the better to swallow it. Within a few days of death the patient had a bad cough, and inclined to choke during paroxysms of coughing. I inferred it was bronchitis. She evidently died from inanition and exhaustion. There was never any well-marked cachexia. She sank away quietly and painlessly, the pain having disappeared several weeks previous to death. There seems to be very little hereditary tendency to malignant disease in her family. Her great-aunt on the mother's side died of cancer of the uterus. The child fell down-stairs, from the top to the bottom, when seventeen months of age, but she apparently did not suffer much from it at the time. There was no syphilis in the family. It is difficult to state what caused the disease.

The autopsy shows that the two tolerably distinct tumors were outgrowths from the tympanal tumor, which was the first one observed.

The early development of the tumor was evidently from the neighborhood of the tympanum, as the first symptom of the disease was paralysis of the sixth nerve, then of the third, and soon afterward of the facial, these passing in the vicinity of its tympanal development. As the paralysis of certain muscles of deglutition did not occur until some time after that of the facial muscles, we may infer that the anterior portion of the facial in the hiatus fallopii, where the petrosal branches are given off from the intumescencia gangliiformis, was invaded by the tumor somewhat later.

At this time, however, the disease had destroyed the inner bony

wall of the tympanum sufficiently to involve the region of the cavernous sinus along, within and beside which pass the sixth and third nerves, which were paralyzed in the first instance.

The intracranial tumor seen in the heliotype is slightly below life-size and distinctly lobulated, and has in only one or two places penetrated the dura mater. It would seem, by this and the other cases reported, that the dura mater was inclined to strongly resist the destructive influences of this form of tumor, although its tendency to involve every variety of contiguous tissue is well enough known.

The absence of brain-lesions seems to be a characteristic of the progress of this form of disease, although the brain must have been pressed upon strongly. The cases herewith reported, although variously called myxo-sarcoma, melano-sarcoma, osteo-sarcoma, round-celled sarcoma, fasciculated sarcoma, etc., seem in the main to exhibit similar characteristics, such as a disposition to grow more slowly at first and very rapidly afterward, when operative measures have been resorted to, and to develop into the soft, encephaloid form of disease, with the production of a fungous mass. Nothing seems clearer than that these tumors should be left alone, for the effort to remove them only aggravates, and produces a tumor of a higher degree of malignancy and having a greater tendency to cellular development. It seems improbable that purulent processes develop these tumors. Very naturally, with a strong tendency to malignant disease, any exciting cause might hasten its development.

Description of the Illustrations.

Plate II., Fig. 1, shows the tumor depending from the ear, but considerably smaller than at the autopsy. The distorted mouth and closed eyelid show the paralysis of the facial and motor oculi.

Plate II., Fig. 2, shows the outer surface of the temporal bone, with its periosteum intact. The transverse dark line is where the bone was sawn across and laid together again. At the left side (when the bone is looked at in its natural position) the mastoid process is seen denuded of periosteum, and the jagged under-surface shows the progress of bone-destruction. Fig. 3 exhibits the inner sur-

face of the same bone; the tumor rested on its surface, but was turned off to the right side to allow the bone to be inspected. In the upper part of the figure a whitish transverse stripe shows where the tumor was attached to the dura mater. The whole inner surface of the bone is seen to be carious, but more especially at the lower (*i.e.*, on the right side) jagged border. An oblique grayish band indicates the presence of osteophytes. The petrous portion is seen broken off and lying near its attachment. It is necessarily out of focus, and looks smoother than it actually was. Immersion in the preservative fluid has also diminished its honey-combed appearance. Plate II., Fig. 4, shows the cerebral tumor in situ and resting on the bone already described. The edge of the bone is seen distinctly above and to the right. A dark line at the apex of the tumor shows where it was cut into. The nodulations on the tumor are not plump and prominent as they were at first, as the solution in which it was immersed has undoubtedly

caused a diminution in the fluid contents of the tumor. The accompanying figure in the text shows, by a dotted line, the outlines of the tumor at the base of the brain.

The autopsy was made by Dr. J. A. Andrews, who kindly went to the patient's house, a distance of seventy miles, in the country, for the purpose.

Autopsy, forty-eight hours after death.—Body greatly emaciated; mouth drawn toward the right side. A large, brain-like growth is situated in the region of the left ear,

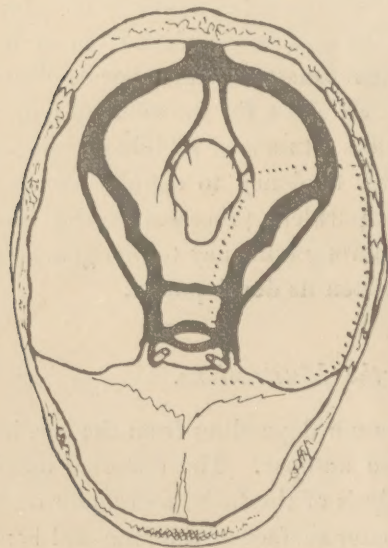


FIG. 5.

which is bounded superiorly by a line extending from the external canthus of the left eyelids to the upper wall of the external auditory canal on the corresponding side. The growth is heart-shaped, with its apex directed downward, and measuring four inches

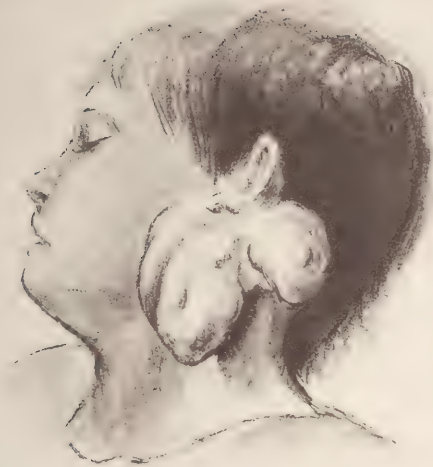


FIG. 1



FIG. 2



FIG. 3



FIG. 4

across the base and five inches in the vertical direction. The growth does not project through the external auditory canal, but through the point of attachment of the pinna to the head, in front and behind.

On removing the calvarium, the dura mater is seen pale, but otherwise normal in appearance. The superior longitudinal sinus contains a long, yellowish red, cord-like clot. The pia mater is lifted by a clear fluid. The convolutions of the brain over the vertex are of normal prominence. There is no exudation at the base of the brain. The removal of the brain displays a growth beneath the dura mater, and filling the left middle cranial fossa and a portion of the anterior and posterior fossæ. The dura mater overlying the growth is thickened and firmly adherent to the latter. The surface of the growth is nodular; one of the ball-like pedunculated projections of the tumor passes under the left anterior clinoid process, displacing the nerves and vessels in this region.

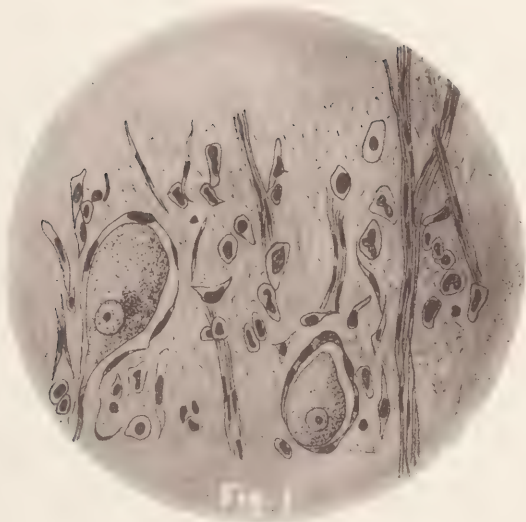
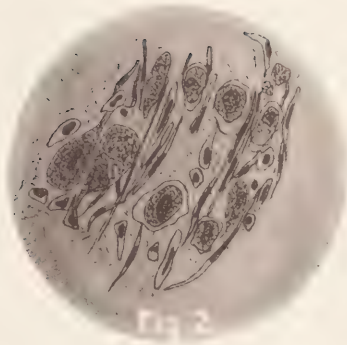
On incising the tumor it presents the appearance and consistence of fat, and is lobulated. The tumor envelopes the lower two-thirds of the petrous bone, which, on removal of the former, is seen carious in every part. The tumor is limited anteriorly by a horizontal line extending across the base of the skull, parallel with the optic foramina; laterally, by a line extending obliquely from the left optic foramen to the anterior condyloid foramen; behind, by a horizontal line touching the anterior condyloid foramen. The entire petrous bone is carious; anteriorly, the carious process extends just behind the temporal suture; the squamous portion of the temporal bone is separated by caries from its articulation with the spine and great wing of the sphenoid; through this gap the tumor projects outward upon the face; posteriorly, the caries extends beyond the temporo-occipital articulation to the margin of the foramen magnum. Behind the mastoid process there is a gap between the occipito-temporal articulation, formed by caries, through which that portion of the tumor situated behind the ear projects. The left superior petrosal and lateral sinuses have been obliterated, and the underlying bone is carious. The carotid canal and middle ear have also been obliterated.

The brain is macroscopically normal in appearance and consistence. The left lateral ventricle contains about $\frac{3}{4}$ ij. of clear fluid. The brain overlying the tumor is not softened.

The microscopical examination, together with the drawings illustrating the description, were made by Dr. T. Mitchell Prudden, Pathologist to the Manhattan Eye and Ear Hospital, etc.

The lobulated tumor which, after preservation in Müller's fluid and alcohol, measured about 8 ctm. in length, 6 ctm. in breadth, and 4 ctm. in thickness, was attached to the inside of the temporal bone, and covered above by the dura mater. It was for the most part soft and gelatinous in consistence, except in the central portions, where it was firmer and less translucent, and distinctly nodular. Within were several small, irregular cavities, some of them filled with blood. Several larger and smaller nodular projections from the upper surface of the tumor had pouched the dura mater upward in saccular dilatations, to which they were closely adherent. The dura was in general somewhat thickened, but over the apex of some of the nodules was thinned, and in two cases was completely perforated, closely encircling the nodules at their base. On the side toward the temporal bone was a ragged, pyramidal cavity, in which lay an eroded fragment of the petrous bone about 2 ctm. long by 1 ctm. wide. Along the inside of the temporal bone, following the upper margin of the tumor, and above the eroded opening, through which the portion of the tumor within was joined to that without the cranial cavity, was a broad line of jagged, irregular osteophytes.

The microscopical examination revealed in general the structure of myxo-sarcoma, similar to that of fragments removed, and sent to me for examination before death. The cells were fusiform, branching, and spheroidal or polyhedral, and in some parts were quite closely crowded together; in others more or less widely separated by structureless, granular, or delicately fibrillated intercellular substance. It was very vascular in many parts, and, in regions where the intercellular substance preponderated, the walls of the smaller vessels were considerably and irregularly pouched. Numerous larger and smaller nerves passed through the substance of the tumor, apparently entirely unchanged. In other places sin-



gle medullated nerve-fibres, or irregular bundles of the same, were seen closely surrounded by the new-growth.

At the upper and inner side of the tumor, and occupying about one-fourth of its bulk, was an irregular, indefinitely circumscribed and somewhat denser portion, which, in addition to the above described myxo-sarcomatous structure, presented well-defined spheroidal and pear-shaped ganglion-cells and non-medullated nerve-fibres, both single and in bundles. The ganglion-cells were finely granular, had large vesicular nuclei, and sharply defined shining nucleoli; they were frequently pigmented near the nucleus, and in many cases were directly connected with non-medullated nerve-fibres. They were, for the most part, inclosed in well-defined, thin, cellular capsules, and were closely surrounded by the tumor-tissue. They were, as a rule, smaller than the space within the capsule, and in some cases the nucleus was at the end of the cell from which the process passed off. The size was variable, the largest having a diameter of 0.035 mm., the smallest 0.015. They were, in many places, closely crowded together; in others, widely separated by the tumor-tissue. Everywhere among them non-medullated nerve-fibres were found in abundance. Plate III., Fig. 1, represents a typical portion of this region.

In some places, associated with these well-formed ganglion-cells, but, as a rule, apart from them, were scattered cells, or larger and smaller cell-groups, so peculiar as to deserve special notice. They were of various shapes, in general more or less spheroidal, more coarsely granular than the ganglion-cells, and, on the average, smaller. The largest measured 0.0375 mm., the smallest 0.0075 mm. They had an irregular-shaped, but usually large nucleus, and usually a well-defined, large nucleolus. In some cases, distinct narrow processes were seen passing off from one end of the cell, in others none. Many were devoid of capsules, but a large proportion were enclosed in a shrunken, apparently structureless non-nucleated capsule, which, in nearly all cases, was considerably larger than the cell itself. Among these cells numerous, very much elongated spindle-cells were seen with rod-like nuclei. A portion of the tumor in which these cells abounded is reproduced in Fig. 2 (Plate III.).

Although not closely conforming to what is known of developing ganglion-cells, it would seem not improbable that these represent such cells, either immature or imperfectly developed.

At one point on the surface of the tumor, near its inner border, a slightly pedunculated nodule about 4 mm. in diameter projected upward, and a small nerve passed down over one side and was lost in the nodule near its base (Plate III., Fig. 3). Sections embracing both nerve and tumor showed that the nerve entered the nodule, which had a structure similar to that of the bulk of the tumor, and the fibres here became separated by the tumor-tissue, and passed off radially within it, where they were apparently lost, for none could be detected entering the main tumor through the short peduncle. This nodule was covered by a thin layer of connective tissue, apparently continuous with the sheath of the nerve. Transverse sections through the nerve before it joined the nodule showed nothing abnormal.

The fragment of the petrous bone presented the usual appearances of caries, except that the granulation-tissue in many parts partook more or less distinctly of the character of the tumor itself. No remnants of the structures of the internal ear were detected. The dura mater showed, at points where it was most closely adherent to the tumor, an infiltration of its inner layers with cells similar to those in the new-growth.

It is evident from the above description, and from the position of the tumor at the base of the brain, that it had involved the Gasserian ganglion, crowding the nerve-cells and fibres apart. Whether it originated here or in the connective tissue of some of the adjacent nerves, cannot be definitely decided from the morphological data, since the process was too far advanced. The very significant relation, however, of one of the peripheral, and presumably more recently developed, nodules of the tumor to a nerve (Fig. 3), the *bevelled on the inside* of the eroded opening through the temporal bone, with osteophytes along its inner border, together with the well-known disposition of the connective tissue of the nerves to the development of myxo-sarcoma, would at least give considerable plausibility to such a conjecture. The extensive destruction of the petrous bone would also indicate

the existence of a morbid process in its vicinity of considerable duration.

The degree of significance which should be attached to the cells represented in Fig. 2 must also be left undetermined. The rare occurrence of the new-formation of ganglion-cells in tumors, together with the meagreness of our knowledge concerning the development of cerebro-spinal ganglion-cells under normal conditions, would suggest the propriety of a simple objective record of the structures in question, without definitely attributing to any portion of the tumor the character of a true neuroma.

The *anatomical diagnosis* would accordingly be myxo-sarcoma, involving, and possibly originating in, the Gasserian ganglion and the nerves in its vicinity, with partial destruction of the petrous and other portions of the temporal bone and the soft parts within them.

The subjoined cases represent tumors similar in kind and locality to the one reported, and may serve to further elucidate the subject. I do not at all infer that the literature of the subject is exhausted; but, with the time at my disposal, it is all I have found.

Dr. C. A. Robertson reported a case of fasciculated sarcoma of the tympanum, in the "Transactions of the American Otological Society for 1870," p. 35. The patient was a woman, forty years of age. She had tinnitus in the affected ear, and deafness. Five years after these symptoms there was an offensive discharge. This was accompanied by pain in the ear and paralysis of some of the branches of the facial nerve. A polypus was partially removed, and excessive hemorrhage followed. The hearing became so reduced that a watch could not be heard laid on the ear or temporal bone. The pre-auricular glands were swollen. Termination of the tumor was not stated, nor its apparent cause.

Wilde, in his treatise on the ear, p. 205, reports a case of malignant disease of the meatus, but it evidently involved the tympanum—whether primarily or secondarily, it is difficult to state. A woman, aged fifty years, whose brother died of cancer, presented herself with a growth in the ear, of many years' duration, accompanied by a very fetid discharge. Had an unhealthy look; complained of giddiness, loss of rest, and nausea. The tumor filled

the meatus and was not pediculated; painful. Effort was made to remove it, but was followed by considerable hemorrhage. Caustics were used, but the mass was never wholly removed. Showed an alarming tendency to reproduce itself. It presented a fungous appearance. A fluctuating tumor on the mastoid was opened, and a dark-colored, fetid matter was discharged. There was facial paralysis; abscesses along the mastoid muscles; rigors; failure of general health; convulsions followed by coma; excruciating pain. Post- and infra-aural regions enlarged; integuments of the mastoid gave way and a large fungoid mass sprouted from this region, which soon grew to the size of a lemon. Fœtor intolerable; death resulted in three weeks from the first appearance of this tumor. Cause of disease probably hereditary. The malignant quality of this tumor was evidently aggravated by the efforts made to remove it. No autopsy.

Another similar case from the same source, p. 207. An apparently healthy boy, seven years of age, had a polypus in the meatus. It was removed several times, but would reproduce itself in a day or two; not long after he had an epileptic fit; this was soon followed by an abscess over the mastoid. This was evacuated, giving exit to pus; this cavity communicated with the meatus. A fungous mass almost immediately sprang from it; parts in front and around the ear became swollen and were boggy to the touch. Repeated attacks of epilepsy, soon followed by death. Autopsy revealed osteo-sarcoma involving the petrous and mastoid portions of the temporal bone. Petrous portion enlarged and softened. The whole presented a fungous mass; internal ear obliterated. The disease was thought to be located in the bone. Brain lying on the tumor unaffected. This again showed, as did my own case, the tendency of the tumor to take on a more rapid growth after being interfered with. Dr. Hartmann, of Berlin, in a translation by Dr. Knapp, in the *Archives of Otolology* for March, 1880, reports a case of round-celled sarcoma of the tympanum, as follows: O. J., aged three and a half years, first seen in October, 1878. Parents, brothers, and sisters healthy. The patient otherwise healthy. Four weeks previously had discharge from the ear, accompanied by pain and inflammation. Two weeks later mother noticed a tumor

in the meatus; found to be a polypus of the size of a pea, which was removed. Others were noticed in the canal, which were subsequently partially removed, were cauterized, but returned in a few days. Nothing peculiar in the appearance of the tumors; membrana and ossicles could not be found. Tumor seemed to start from all sides of the tympanum and inner end of the meatus. Cauterization again done, but tumor reappeared. At the end of October most of the mass was again removed, and the remainder was destroyed by galvano-cautery. It again developed, and the surroundings of the ear, the parotid, the mastoid and infra-auricular regions swelled; an abscess formed below the ear and was incised. Its cavity communicated with the meatus. Other tumors formed in vicinity of the ear and in the meatus. These masses were found to be round-celled sarcomata. In the scant intercellular substance of the tumors were found numerous round cells and some spindle-shaped elements. The tumor, as it developed, carried the auricle outward. In February it was the size of a goose-egg. General health declined. There was bronchitis, loss of appetite, diarrhœa, emaciation, and headache.

On March 21st, bilateral convulsions occurred, lasting several hours, then completely disappeared. A prominence in the right side of the fauces interfered with mastication and deglutition. Death resulted on March 28th; convulsions reappeared two days previously, accompanied by loss of consciousness and coma.

Autopsy.—The tumor externally was 14 ctm. in length, 12 ctm. in breadth, and 9 ctm. in height. The auricle was on its crest. The tumor consisted of a number of lobes, varying in size from a walnut to a hen's egg. There were ulcerated places communicating with pus-cavities. The upper and posterior wall of the meatus, the roof of the tympanum, and a part of the squamous portion, was destroyed; at the latter point the external tumor communicated with another tumor in the cranial cavity. This one covered the whole squamous portion, the external half of the upper surface and a small part of the posterior surface of the petrous portion. The outer part of the mastoid process was destroyed, its cells being filled with the tumor. Inner part of mastoid was also invaded by the tumor. It was easy to separate the petrous pyra-

mid from the mastoid process. Labyrinth healthy, stapes found imbedded in the tumor. Inner auditory canal completely free. The author remarks that the fact that this case appeared malignant from the start presented a peculiarity, as most of this class of tumors was preceded by a chronic otorrhœa and polypi, indicating an inflammatory origin. It seems to me that the cases I have here reported for the most part point to the opposite condition—that they *have* been malignant from the first, and were not cases of innocuous polypi which had subsequently developed into malignant tumors. The first one quoted from Mr. Wilde, however, may have been in the outset an ordinary polypus. He further states that he has found but one similar case reported in literature, that published by Wishart in the *Edinburgh Medical and Surgical Journal*, and cited by Toynbee in his treatise on “The Diseases of the Ear,” p. 392, edition 1868, by Hinton. The case is as follows: A child three years old had severe pain in the right ear for some weeks, followed by a discharge: a tumor surrounding the ear appeared, soon ulcerated, and discharged a large quantity of fetid, bloody matter; hemorrhages frequently occurred; child died in fifteen weeks after the first appearance of the disease. The tumor was as large as the child’s head. Externally the condyloid process of the lower jaw and the zygomatic process were destroyed. Petrous bone completely destroyed. The tumor extended into a large orifice in the squamous bone, forming a depression on the middle lobe of the brain, which was in other respects quite sound. Dr. Hartman thinks the tumor he reported sprang from the submucosa of the tympanum.

He seemed to think that the effort to remove the tumor was justifiable, as this class of growths, if left to themselves, invariably terminate in death; because the operation afforded *some slight chance for success*; we think it probably did not.

Mr. James Hinton, in his book, “The Questions of Aural Surgery,” London, 1874, says, under the head of Aural Polyps, p. 195: “Now and then, but rarely, a true malignant growth simulates a polypus, and demands caution in treatment. The general cachexia, the pain, the livid color, the great tendency to bleed, and the swelling which is almost always present around the ear, serve to dis-

tinguish the malignant growth. A soft, persistent swelling about the attachment of the auricle, attended with great pain, I have never known except in malignant disease." Wilde, it will be remembered, speaks of the livid color of the malignant growths in the ear as being characteristic.

I do not think that the color of the tumor is a reliable guide as to its nature, as these and subsequent cases will show, the true character of the growth being only found by the microscopical examination, but may be suspected by its behavior. Mr. Hinton speaks of a *cachexia* as accompanying malignant growths of the ear. In not more than two of the cases here reported has there been any true cachexia, and I believe, as a rule, none is found in sarcomatous tumors in this region.

A case of intracranial sarcoma is reported by J. W. Hulke, F.R.C.S., in the *Medical Times and Gazette*, January 20, 1877, which bears a close resemblance to the tumor I have reported.

CASE.—J. W., a boot clicker, aged thirty-nine years. The tumor seemed to arise from the tip of the petrous bone; as the author thinks, from the endosteum. It had involved and destroyed the Gasserian ganglion, the third, fourth, and sixth nerves. Its direction was forward, extending to the posterior part of the orbit through the sphenoidal fissure, and involved the posterior part of the orbit and some adjacent parts. The cavernous sinus was destroyed, together with the eighth nerve and hypoglossal at the foramina of exit from the skull. No brain-symptoms. As the patient was syphilitic, a gummy tumor was diagnosticated during life. Hearing of the ear corresponding to the side of the tumor was not as good as the other. The eyeball was much inflamed, and protruded excessively from the orbit, on account of the retro-bulbar tumor. Pain very great. Paralysis of the muscles supplied by the nerves involved ensued, such as protruding the tongue to one side, squint, myosis, etc.

Dr. George P. Field, in the *Lancet* for December 8, 1877, reports a case of a sarcomatous tumor in connection with the auditory nerve, in which there was blindness and deafness. Patient was a woman aged twenty-nine years. Had brain-symptoms; was admitted to the hospital January 29, 1877, and died April 29, 1877. Dr. Mahomed made the autopsy. He found a tumor the size of a

Maltese orange attached to the posterior surface of the right petrous bone, just above the internal meatus. It resembled the cerebellum in appearance, and was of soft consistency, like brain-substance. It seemed to have its origin from the dura mater lining the internal meatus and unsheathing the auditory nerve. It was found to be a round-celled sarcoma of moderately rapid growth. The author reports it on account of its value as a rare lesion of the auditory nerve. When the specimen came under observation the symptoms were too far advanced for an exact diagnosis of its point of origin to be made. I have found two other cases of sarcoma of the auditory nerve, but their bearing on the present subject was somewhat indirect.

A case of fibro-sarcoma of the auditory nerve is reported in the *Archives of Ophthalmology and Otolaryngology*, New York, Vol. III., p. 135, by Arthur Boettcher, of Dorpat.

Prof. Moog, of Heidelberg, in the *Archives of Ophthalmology and Otolaryngology*, Vol. IV., 1874, p. 482, reports a case of sarcoma of the auditory nerve, in which there was fatty metamorphosis and partial destruction of the organ of Corti. The tumor was a spindle-celled sarcoma. The cells were very abundant, vessels were numerous and very broad, with the intercellular substance little developed. The tumor is described as being unequal—in one place harder and transparent, and in another gelatinous and soft, like mucus. Patient was a woman, aged forty-nine years. Duration of the disease was from August, 1870, to August 11, 1871. On July 24th the condition is summed up as follows: permanent headache, dizziness, weakness of sight, atactic movements of left arm (left ear was affected), anaesthesia of left half of the face, so that the food falls out of that side of the mouth; swallows her food the "wrong way," and fluids are regurgitated into the left nostril, rarely into the right. Left side of face and tongue and left eye less sensitive than right, although not quite anaesthetic. Left eye convergent strabismus. Left frontalis has a permanent tonic spasm. Lower lid of the left eye makes jerking movements toward the middle line. Left arm makes atactic movements, but only under impulses of the will. In sleep, and when attention is withdrawn from it, it lies quiet. Lower lip pendulous on left side.

August 1st.—Condition unchanged. Temperature remains steadily below 37.5° ; diarrhœa continued (previously had been a frequent symptom); patient growing weaker. On August 11th swallowed food the wrong way, fell back with a rattle in her throat, turned black in the face, and died in a few minutes. There were also eye-symptoms. He states that Landifort and Lévêque-Lasource have, among older authors, described this kind of tumor, and recently Brückner and Böttcher have also reported them. Forster and Voltolini are also quoted. Virchow states that the acusticus presents new formations oftener than any other cerebral nerve. It is not stated whether the sheath of the acusticus was the starting-point of the disease, simply stating that the "peduncle of the tumor is formed by the auditory nerve." The facial nerve was free, having suffered only from compression. Causation of these tumors is here stated to be mechanical injuries (Brückner's case: "Beitrag zur pathol. Anatomie der Geschwülste im Verlauf der Nerven." Manitz, 1844) and syphilis (Aronssohn: "Observations sur les tumeurs développées dans les nerfs." Strasbourg, 1822).

Virchow states mechanical injuries and syphilis as the cause of these tumors. The tumor here reported seemed to have been caused by sleeping all night by an open window. Moos, however, raises the question that the tumor might have been present before the exposure, but that the cold excited it to a more active development.

In one hundred cases of ear disease treated by Dr. Kirk-Duncanson, in the *Edinburgh Medical Journal*, March, 1878, one of malignant growth was noted occurring in purulent otitis media complicated with mucous polypi, long under treatment. The malignant growths distended the external auditory canal and implicated the auricle. They were very painful, recurred often after removal, and finally were fatal. It is not stated what variety of tumor this was, but it very likely was a sarcoma.

Dr. George T. Stevens, of Albany, in the *Archives of Ophthalmology and Otology*, New York, July, 1879, p. 171, reports a case of spindle-celled sarcoma of the acoustic nerve. The location of the tumor on the nerve is not stated, but the nerve-fibres are described as lost in the substance of the tumor. Patient

was a girl, seventeen years of age. Her eyes were affected with a marked convergent squint, but previous to the age of six she had a divergent squint. Externi were paralyzed; sight $\frac{2}{3}$ in each, pupils sluggish. Hearing lost in the left ear and imperfect in the right. Both eyes had choked disks. Headache in frontal and occipital regions; signs of meningitis; no paralysis of the facial, although it must have been pressed upon. From the time of the first appearance of the squint until death was several years. Her gait toward the last showed a lack of co-ordination, and a diagnosis of trouble at the base of the brain was made previous to the autopsy.

In the *Archives of Otolaryngology*, Vol. VIII., No. 4, is a case of parotidian and intratympanic tumor, reported by Dr. Knapp, which may properly be mentioned here. The patient was under the care of Drs. Knapp, H. B. Sands, and A. H. Buck, of New York, and Drs. S. H. Peck and S. J. Parker, of Ithaca, N. Y.

J. H. W., aged 37 years, consulted Dr. K. on May 7, 1877, on account of sudden deafness in the right ear. Below and in front of this ear was a tumor the size of a hen's egg, which the patient first noticed six or seven years previously. Had grown slowly until the last six months, when it took on a more rapid growth. Left ear, chronic painless otorrhoea. Right ear suddenly became deaf three days before consulting the doctor.

The membrane was bluish red, convex, and, on pressure with a probe, yielded as though a soft substance were in the tympanum. The membrana was punctured with a paracentesis-needle on May 8th; penetrated a tumor, which resulted in considerable hemorrhage. Tumor was touched with a probe, and seemed to be a soft, fleshy mass. The parotidian tumor was thought to connect with the tympanic tumor through the Glaserian fissure.

May 23d.—Great pain in the ear for a day and a night. Aural tumor found to occupy inner half of meatus. The latter was red, swollen, and tender.

May 29th.—Pain relieved. An abscess had formed, and pus escaped on pressing the tragus.

June 20th.—No more inflammation; tumor fills the meatus. Dr. K. having to go to Europe, Dr. Buck took charge of the case.

Dr. Sands removed the tumor of the parotid on June 26th. It was found to have no connection with the aural tumor. The latter was also partially removed at the same sitting, with Dr. Buck's assistance.

July 24th.—Returned to his home nearly well. Dr. Buck states that the external tumor was chiefly fibrous, but partly cartilaginous and cellular.

July 28th.—Incision for removal of parotid tumor healed; pain in ear continues, and aural tumor increased perceptibly in size; was mostly removed by incision, and was followed by considerable hemorrhage. Other efforts were made to remove the remainder, but so much bleeding resulted that the meatus needed to be stopped with cotton to arrest it. This tumor resembled boiled sago, and had no fibrous elements in its composition, as was the case in the tumor I removed from the meatus.

Microscopic examination by Dr. W. H. Porter, of New York. A detailed description is given, the conclusion of which is that both the parotidean and aural tumors were essentially a chondrosarcoma (alveolar), or a chondro-adenoma, or chondro-carcinoma. Dr. Buck's description would make it a chondro-adenoma. On the same day another effort was made to remove the growth, but hemorrhage again interrupted the operation.

July 26th.—Red-hot needles were used to arrest the bleeding, but on the rongeur being again used, the bleeding returned; soon after this an abscess formed below the mastoid. Patient in a few days returned to Ithaca, and was treated by Dr. Peck, who records as follows:

August 14th.—Patient fatigued by his journey home; much pain; an indurated tumor below the auricle made its appearance and carried the ear outward.

October 25th.—Consultation by Drs. Knapp, Peck, Sands, and Buck. Tumor below auricle increased in size; meatus filled with a tumor having fistulous openings discharging pus; facial paralysis since five days. Decided not to operate; hoped it might slough and exfoliate, and thus be cured. Returned home. Tumor continued to grow. It assumed a very similar appearance to the tumor I have reported, and the patient died from exhaustion on

September 15, 1878, fifteen months after the first operation. The tumor measured seven inches, eight inches, and five inches in its three diameters. The ear rested on the outer surface of the tumor. There was no mental disturbance.

Dr. Knapp remarked that the connection between the two tumors may be assumed, but in the primary stage at least was not proven. Dr. Buck stated that the parotid was not involved in the growth. Dr. Knapp is in favor of attempting the removal of growths of this nature from the tympanum and immediate vicinity. He refers to Schwartze, in his paper on a primary epithelial cancer of the middle ear, in the ninth volume of the *Archiv für Ohrenheilkunde*, p. 208, etc., 1875; and in his "Pathological Anatomy of the Ear," translated by J. O. Greene, p. 29, etc., 1879, for the literature of the subject, compiled by Schwartze and comprising nineteen cases, to which is added a case of primary epithelial cancer of the petrous bone, by Luce (*Archiv für Ohrenheilkunde*, XIV., p. 127), 1878, and the case of Delstanche (*Archiv für Ohrenheilkunde*, XV., p. 21), 1879.

Dr. Harlan, in the *Philadelphia Medical Times* for December, 1873, reports a case of round-celled sarcoma in the ear of a girl three years of age. Two months before examination she had a bloody discharge from the left ear, with pain on swallowing, swelling about the ear, the face being drawn to the right. Appetite failed, and the child became feeble. Meatus externus was filled by a firm, globular polypus. There was a fluctuating swelling below and behind the auricle. Removal of the polypus and an incision behind the ear resulted in a discharge of sanious pus; no dead bone was detected. Left side of the face much swollen, as well as the left side of the tongue. Left eye became closed, but was unaffected by the exposure; pupil normal. Polypus was twice removed subsequently. Twenty-eight days after the first examination the tumor was the size of a hen's egg, bright red, lobulated, and having a granular surface. Subsequently the upper lid of the left eye almost covered the eye; the conjunctiva became congested, the cornea hazy, and the lower fourth infiltrated; free sanious discharge from the right nostril. Seventeen days later, the cornea was penetrated by an ulcer which pro-

duced prolapsus iritis. Breathing through the mouth and nostril had become laborious.

In a week from this she died, apparently from exhaustion.

Double convergent strabismus appeared some time before death, but nearly disappeared at a later period.

On autopsy, the bone at the base of the tumor behind the ear was found roughened and eroded. Inner tympanic wall destroyed. Inflammation of the eye was regarded as neuro-paralytic.

I had thought the case reported by me to be exceedingly rare, this being the only one of the kind occurring in the Manhattan Eye and Ear Hospital for nearly a dozen years; but I find, on investigation, although it is comparatively rare, it is not absolutely so.

